**A company is having manufacturing plants and warehouses in various parts of the country. They manufacture ice-cream and milk products. They want to build software to achieve two goals.**

- **Manage the inventory**
- **Quickest delivery to the customers**

# ASSIGNMENT 1

**1. Please make a BRD which can be presented to the client along with complete development and resource plan.**

## Business Requirement Document (BRD)

**Project Name: Inventory and Delivery Management System**
**Project ID:** IDMS-001
**Version ID:** V1.0
**Author:** Swati Kurwade

**Document Revisions**

| Date | Version Number | Document Changes |
|---|---|---|
| 05/02/2025 | 0.1 | Initial draft |
| 19/02/2025 | 1.1 | Updated requirements based on stakeholder feedback |
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**Approvals**

| Role | Name | Signature | Date |
|---|---|---|---|
| Project Sponsor | Mr. Chawli | | 10/04/2025 |
| Business Owner | Ms. Aggarwal | | 10/04/2025 |
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| Lead Quality Lead | Ms. Kamat | | 10/04/2025 |

**RACI Chart for This Document**

| Task/Activity | Project Sponsor | Business Owner | Project Manager | System Architect | Development Team | QA Team | Support Team | End User |
|---|---|---|---|---|---|---|---|---|
| **Define Business Goals & Strategy** | A | R | C | I | I | I | I | I |
| **Approve Budget & Resources** | A | R | C | I | I | I | I | I |
| **Define Business & Functional Requirements** | I | A/R | C | I | I | I | I | I |
| **Project Planning & Timeline** | I | C | A/R | I | I | I | I | I |
| **Define System Architecture** | I | I | C | A/R | C | I | I | I |
| **UI/UX Design & Wireframing** | I | I | C | I | C | I | I | R |
| **Develop Core Functionality** | I | I | C | C | A/R | I | I | I |
| **Implement Security & Compliance** | I | I | C | A/R | C | I | I | I |
| **Conduct Unit & Integration Testing** | I | I | C | C | R | A | I | I |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Conduct User Acceptance Testing (UAT)** | I | R | C | I | I | C | I | A/R |
| **Deployment & Release Management** | I | I | A/R | C | C | C | I | I |
| **Post-Deployment Support & Maintenance** | I | I | A | C | I | C | A/R | C |
| **Continuous Improvement & Updates** | I | R | A | C | C | C | C | I |

## 1. Introduction

### 1.1. Business Goals

- **Efficient Inventory Management** – Enable real-time tracking and management of stock across multiple manufacturing plants and warehouses to prevent shortages, minimize overstocking, and reduce inventory wastage.
- **Optimized Delivery Logistics** – Streamline delivery operations by optimizing routes, ensuring timely product delivery to customers while minimizing transportation costs.
- **Enhanced Customer Experience** – Improve order fulfillment speed, provide real-time order tracking, and ensure seamless delivery to maximize customer satisfaction.
- **Cost Reduction** – Automate inventory and logistics processes to reduce manual errors, minimize wastage, and enhance operational efficiency.
- **Data-Driven Decision Making** – Leverage analytics for accurate demand forecasting, improving stock management and reducing supply chain inefficiencies.
- **Scalability & Flexibility** – Ensure the system is adaptable to business growth, supporting multiple locations and integrating with other enterprise solutions for seamless operations.

### 1.2. Business Objectives

- **Real-Time Inventory Visibility** – Track stock levels across multiple locations in real time to prevent shortages, overstocking, and inventory discrepancies.
- **Demand Forecasting & Planning** – Utilize historical sales data and predictive analytics to optimize inventory levels, reduce wastage, and enhance resource planning.

- **Automated Order Processing** – Streamline order fulfillment by automating order assignments to the nearest warehouse or plant, reducing manual errors and improving efficiency.
- **Optimized Inventory Management** – Ensure optimal stock levels across locations, minimizing holding costs while preventing supply disruptions.
- **Improved Delivery Time & Accuracy** – Enhance logistics and route optimization to ensure timely and precise product deliveries, increasing customer satisfaction.
- **Inventory Movement & Expiry Tracking** – Monitor stock movement and track expiry dates, especially for perishable goods like milk and ice cream, to reduce spoilage and ensure product freshness.
- **Enhanced Customer Satisfaction** – Improve order fulfillment speed, accuracy, and reliability to boost customer loyalty and retention.
- **Cost Efficiency & Waste Reduction** – Automate processes to reduce manual errors, lower operational costs, and minimize product wastage.
- **Scalability & Integration** – Design a system that supports business expansion, integrates seamlessly with existing enterprise solutions, and adapts to changing market demands.

## 2. Business Rules

### 2.1 Organization Policies

- **Real-Time Inventory Accuracy** – Inventory data must reflect real-time stock levels across all plants, warehouses, and dispatch centers to maintain operational efficiency.
- **Stock Movement Recording** – All inventory transactions (incoming, outgoing, transfers, and adjustments) must be recorded in real-time to ensure data accuracy.
- **Inventory Audits** – The system must support periodic audits to verify stock levels and ensure consistency with actual inventory.
- **Expiry Management** – All perishable products (milk and ice cream) must have clearly defined expiry dates, with automatic alerts for nearing expiration.
- **Order Processing Efficiency** – Orders must be processed promptly, verifying stock availability before order confirmation to prevent delays.
- **Sensitive Data Protection** – Customer information, inventory data, and financial records must be encrypted both at rest and in transit for security compliance.

### 2.2. Procedures

- **Inventory Transaction Recording** – All stock additions, removals, and transfers must be captured in the system before physical movement.
- **Automated Replenishment** – The system must generate replenishment orders when stock falls below minimum thresholds to avoid stockouts.
- **Stock Alerts & Reports** – Automatic alerts and reports should highlight low stock, expiry dates, and aging stock to optimize inventory control.
- **Order Fulfillment Optimization** – Orders should be validated for product availability, and if a single location cannot fulfill them, the system must prioritize fulfillment from the nearest warehouse.
- **Picking List Generation** – Upon order confirmation, the system should generate a picking list indicating product locations for warehouse staff.
- **Standardized Packaging** – Orders must be packaged per company standards, ensuring security, appropriate labeling, and compliance with handling requirements.

- **Perishable Product Handling** – Packaging for perishable products must include temperature-sensitive labels or handling instructions for ice cream and milk.
- **Route Optimization** – The system must generate the most efficient delivery route based on customer location, delivery window, and inventory availability.
- **Real-Time Delivery Tracking** – All deliveries must be tracked in real-time, with automated notifications updating customers on their order status.
- **Issue Resolution & Customer Support** – Customer service representatives must have system access to review order history and delivery status to resolve complaints (e.g., late deliveries, incorrect items).
- **Customer Feedback & Reports** – The system must track customer complaints and feedback, providing management with reports for continuous improvement.

### 2.3. Rules & Regulations

- **Regulatory Compliance** – The software must adhere to all food safety and regulatory standards, such as FDA guidelines and local health laws for perishable goods.
- **Temperature Control Monitoring** – Perishable products must be tracked for temperature compliance throughout the supply chain to ensure safety and quality.
- **Delivery Compliance** – The system must prioritize the quickest delivery routes while adhering to regulatory restrictions.
- **Data Retention for Audits** – Inventory and order data must be stored for at least 5 years (or as per applicable laws) for auditing and compliance purposes.
- **Batch & Storage Tracking** – Inventory records should include batch numbers, expiry dates, storage locations, and quantities for traceability.
- **Product Quality Control** – The system must flag and prevent the sale of any product with compromised quality (e.g., out-of-temperature range, near-expiry).

### 2.4. Security Rules

- **User Authentication** – All users must authenticate using secure methods (e.g., username, password, multi-factor authentication) before accessing sensitive data.
- **Data Encryption** – All sensitive data (customer information, payment details, inventory records) must be encrypted using industry-standard protocols.
- **Data Compliance & Privacy** – The system must comply with data protection regulations, including secure deletion of customer data upon request, if applicable.

### 2.5. Additional Business Rules

- **Inventory Replenishment** – Minimum stock levels must be maintained in each warehouse to prevent stockouts.
- **Order Allocation Efficiency** – Orders should be fulfilled from the nearest warehouse to the delivery location to reduce lead times.
- **Priority Delivery for Perishables** – Perishable items, such as milk products, must be prioritized for the fastest possible delivery.
- **Demand-Based Manufacturing** – Production schedules should be adjusted dynamically based on demand forecasts to prevent overproduction and minimize waste.

## 3. Background

The company manufactures milk and ice cream products, operating multiple plants and warehouses to serve wholesalers and direct consumers. Managing perishable dairy products presents challenges such as inventory visibility issues, inefficient stock coordination, and unpredictable delivery times. Without a centralized system, tracking stock levels is difficult, leading to stockouts, overstocking, and fulfillment delays. Delivery inefficiencies further impact time-sensitive products like milk and ice cream, while strict food safety regulations require batch tracking, temperature control, and proper documentation. Any deviations can compromise product quality and result in waste or regulatory penalties. Additionally, customers expect fast, reliable deliveries, but inconsistent order tracking affects satisfaction. These inefficiencies hinder operational efficiency and business growth. To remain competitive, the company must streamline inventory management, logistics, and regulatory compliance, ensuring product quality and timely deliveries while minimizing waste and enhancing customer trust.

### 3.1. Challenges & Pain Points

- **Lack of Real-Time Inventory Visibility** – Stockouts, overstocking, and inefficient stock movement.
- **Inefficient Stock Coordination** – Slow transfers between plants and warehouses, delaying order fulfillment.
- **Delayed & Unoptimized Deliveries** – Unpredictable delivery times, especially for time-sensitive products.
- **Fragmented Systems** – Scattered inventory management causes processing delays and inconsistencies.
- **Regulatory Compliance Issues** – Manual tracking of batch numbers, expiry dates, and temperature logs risks errors.
- **Strict Food Safety Requirements** – Temperature-sensitive products require controlled storage and transit conditions.
- **Customer Expectations** – Lack of real-time tracking and delivery updates leads to dissatisfaction.

### 3.2. Expected Benefits

- **Real-Time Inventory Tracking** – Prevent stockouts, reduce waste, and improve stock movement.
- **Improved Order Fulfillment** – Faster stock transfers and optimized warehouse coordination.
- **Optimized Deliveries** – Route optimization for faster and more reliable deliveries.
- **Integrated Operations** – Centralized system eliminates inefficiencies in order processing.
- **Regulatory Compliance Automation** – Accurate batch tracking and automated safety checks.
- **Enhanced Food Safety** – Ensured temperature control for perishable items.
- **Better Customer Experience** – Live order tracking, timely deliveries, and improved service reliability.

## 4. Project Scope

This project aims to develop and implement an integrated system for managing inventory and optimizing delivery processes for a manufacturing company producing ice cream and milk

products. The system will enhance real-time inventory tracking, order fulfillment, and delivery logistics to improve efficiency and customer satisfaction.

### 4.1. In-Scope Functionality

- **Inventory Tracking** – Centralized, real-time monitoring of raw materials, work-in-progress, finished goods, and packaging supplies.
- **Demand Forecasting** – AI-driven demand prediction based on historical sales data, seasonal trends, and consumption patterns.
- **Automated Stock Management** – Alerts for low-stock items, expiry dates, and reorder points to prevent stockouts and waste.
- **Stock Rotation & Expiry Tracking** – FIFO/FEFO-based stock rotation to minimize spoilage.
- **Order Processing & Fulfillment** – Automated order allocation to the closest warehouse for faster delivery.
- **Customer Order Management** – Online order placement, real-time tracking, and status updates via email, SMS, or app notifications.
- **Delivery Optimization** – Route planning for cost-effective and timely deliveries, ensuring compliance with temperature-sensitive logistics.
- **Temperature Monitoring** – Continuous tracking of transport conditions to maintain product quality.
- **Returns Management** – Handling defective or damaged products for better customer experience.
- **Customer Support & Feedback** – Support via chat, phone, or email, and post-delivery feedback collection.
- **Reporting & Analytics** – Insights on inventory turnover, order fulfillment, and delivery performance.

### 4.2 Out-of-Scope Functionality

- Development of new product lines or modifications to production methods.
- Integration with external suppliers or supplier-to-manufacturer tracking.
- Marketing, sales campaigns, and CRM functionalities.
- Accounting, finance management, and invoicing.
- Physical expansion of warehouses or transportation infrastructure (e.g., new trucks or storage facilities).
- Integration with external third-party logistics providers.
- Development of additional product lines.

## 5. Assumptions

- **Accurate Data Availability** – The company has reliable data on inventory levels (raw materials, finished goods), sales, and demand patterns to support the inventory management system.
- **Real-Time Data Access** – All departments (production, warehouse, sales, logistics) can access and update real-time inventory data for informed decision-making.
- **Inventory Tracking Tools** – The company will provide necessary hardware (barcode scanners, RFID systems) for real-time stock tracking.
- **Historical Data Utilization** – Past sales and demand trends will be effectively analyzed for demand forecasting, production planning, and delivery prioritization.

- **Optimized Delivery Routes** – Accurate customer location data and potential delivery challenges (traffic, road conditions) will be factored into route planning.
- **Feasible Delivery Timeframes** – Quick deliveries will be achievable within the company's current logistics and operational capabilities.
- **Customer Adoption of Digital Platforms** – Customers will actively use emails, SMS, or order tracking systems for updates and interactions.
- **Efficient Customer Feedback Collection** – The company will have mechanisms in place to gather, process, and act on customer feedback for continuous improvement.
- **Employee Readiness & Training** – Employees in logistics, production, and customer service are either familiar with or will be trained to use the new system.
- **Network & Hardware Infrastructure** – All warehouses and plants have network access and necessary hardware for seamless system integration.
- **Employee Tech Proficiency** – Manufacturing and warehouse employees have basic computer skills and can be trained to use the software.
- **Accurate Data Migration** – Existing inventory, sales, and distribution data is up-to-date and ready for migration to the new system.

## 6. Constraints

- **Perishability of Products** – Ice cream and milk require fast deliveries; meeting tight delivery windows, especially in urban areas or peak seasons, can be challenging.
- **Budget Limitations** – The project must stay within financial constraints, which may limit the scope and functionality of the initial release.
- **Ongoing Operational Costs** – Maintenance, software licensing, and staff training may increase operational expenses, requiring careful budget management.
- **Data Accuracy & Availability** – Real-time tracking and decision-making depend on accurate, up-to-date data; poor data entry could compromise system efficiency.
- **Warehouse Space Constraints** – Limited storage capacity for raw materials, finished goods, and packaging could impact inventory management efficiency.
- **Employee Training & Adoption** – Resistance to change or lack of technical skills could delay the adoption of new processes, affecting overall system efficiency.
- **Demand Fluctuations** – Seasonal demand changes and promotional campaigns can cause stock imbalances, making accurate forecasting critical.
- **System Integration Challenges** – Ensuring compatibility with existing hardware and software across multiple locations may require additional effort.
- **Regulatory Compliance** – The system must adhere to data privacy regulations and food safety standards to protect customer and business data.

## 7. Risks & Mitigation

### 7.1. Business Risks

- **Supply Chain Disruptions** – Shortages of key ingredients (milk, cream, sugar, flavorings) due to supplier issues, weather conditions, or trade disruptions could delay production and increase costs.
    - *Mitigation: Establish multiple supplier contracts to ensure a steady supply of raw materials. Implement demand forecasting and stockpile essential ingredients to mitigate potential shortages.*

- **Production Bottlenecks** – Delays in receiving raw materials or packaging could impact production capacity and inventory forecasting.
  - *Mitigation: Optimize supplier relationships with proactive order tracking. Maintain buffer stock for critical materials and streamline production scheduling.*

- **Employee Resistance** – Staff accustomed to existing processes may resist adopting the new system, delaying implementation.
  - *Mitigation: Provide comprehensive training, conduct workshops, and offer incentives to encourage adoption. Communicate benefits clearly to gain buy-in from employees.*

- **Operational Disruptions** – Transitioning to the new system may temporarily affect order fulfillment and deliveries.
  - *Mitigation: Implement a phased rollout with parallel operations before full transition. Ensure contingency plans are in place for critical business operations.*

- **Customer Dissatisfaction** – Any issues in the initial rollout could lead to delayed deliveries, complaints, and loss of business.
  - *Mitigation: Conduct pilot testing before full deployment. Establish a responsive customer support team to address issues promptly and improve service recovery.*

- **Regulatory Non-Compliance** – Failure to meet food safety regulations could result in product recalls, fines, or legal consequences.
  - *Mitigation: Regular compliance audits and staff training on regulatory requirements. Implement automated compliance checks within the system.*

### 7.2. Inventory & Logistics Risks

- **Incorrect Inventory Tracking** – Errors in stock management could cause stockouts or overstocking, leading to financial losses.
  - *Mitigation: Use automated inventory tracking systems with real-time data synchronization. Conduct regular stock audits to verify accuracy.*

- **Limited Production Capacity** – If demand surpasses production capabilities, meeting delivery deadlines may be challenging.
  - *Mitigation: Expand production capacity by optimizing workflows, outsourcing peak-period demands, or investing in scalable production infrastructure.*

- **Refrigeration Failures** – Any breakdown in cold storage or transport refrigeration could lead to product spoilage, affecting brand reputation.
  - *Mitigation: Implement predictive maintenance for refrigeration units and establish backup cold storage solutions.*

- **Delivery Delays** – Inefficient route planning or external factors (traffic, road closures) could impact timely deliveries.
  - *Mitigation: Use AI-driven route optimization tools and maintain backup logistics partners for emergency deliveries.*

### 7.3. Technical Risks

- **System Integration Issues** – Compatibility challenges with existing hardware and software may cause delays.

    - *Mitigation: Conduct thorough integration testing before deployment. Ensure API compatibility and involve technical consultants for smooth implementation.*

- **Data Migration Risks** – Errors or inconsistencies in migrating legacy data could impact operational accuracy.
    - *Mitigation: Perform data validation and backup before migration. Implement a stepwise migration approach with rollback mechanisms in case of errors.*

- **Performance Limitations** – System inefficiencies could lead to slow data processing, affecting order fulfillment speed.
    - *Mitigation: Optimize system architecture for scalability and performance testing. Use load balancing and cloud-based solutions for high-speed processing.*

- **Maintenance & Updates** – Unforeseen system maintenance or update failures could disrupt operations.
    - *Mitigation: Schedule regular maintenance during off-peak hours. Implement automated monitoring to detect potential failures before they occur.*

### 7.4. Security & Compliance Risks

- **Data Privacy & Security** – Unauthorized access to sensitive inventory or customer data could lead to breaches and legal issues.
    - *Mitigation: Implement role-based access control, data encryption, and regular security audits to prevent unauthorized access.*

- **Regulatory Changes** – Modifications in food safety, labeling, or data protection laws may require costly adjustments.
    - *Mitigation: Stay updated on regulatory developments. Design the system to be flexible and adaptable for compliance updates.*

### 7.5. Project Management Risks

- **Scope Creep** – Uncontrolled expansion of requirements may increase costs and delay implementation.
    - *Mitigation: Define a clear project scope with documented requirements. Use change control procedures to evaluate and approve new requirements systematically.*

- **Vendor Dependency** – Reliance on third-party software, hardware, or logistics providers could introduce risks if they face delays or service failures.
    - *Mitigation: Establish contracts with multiple vendors and have contingency plans in place for key dependencies.*

- **User Adoption & Training** – Insufficient training may lead to operational errors and inefficiencies in the early phases of system use.
    - *Mitigation: Develop structured training programs, provide hands-on workshops, and offer ongoing support for users to ensure smooth adoption.*

## 8. <u>Business Process Overview</u>

### 8.1. Legacy System - (AS-IS)

The current system is primarily manual and lacks real-time tracking, leading to inefficiencies in order management, inventory control, and deliveries.

#### 8.1.1. Inventory Management

- **Manual Tracking** – Inventory is tracked manually or through disparate systems, causing data inconsistencies.
- **Limited Visibility** – No centralized system, leading to delays in stock level updates.
- **Stock Replenishment Delays** – Manual ordering often results in overstocking or stockouts.
- **Error-Prone Data Entry** – High dependence on manual entry increases data errors, making inventory records unreliable.

#### 8.1.2. Order Fulfillment and Delivery

- **Non-Optimized Order Routing** – Orders are dispatched without optimized routes, leading to longer delivery times and higher costs.
- **Lack of Real-Time Tracking** – Customers and internal teams have no real-time visibility into order status.
- **Limited Customer Communication** – No automated updates on order status or delivery timelines.
- **Frequent Delivery Delays** – Due to inefficient route planning and lack of streamlined dispatch processes.

#### 8.1.3. Data Analysis and Reporting

- **Inconsistent Reporting** – Reports are manually aggregated, leading to errors and delays in decision-making.
- **Limited Demand Forecasting** – Historical sales data is used without advanced analytics, leading to inaccurate demand predictions.
- **Lack of Performance Insights** – No structured KPI tracking for inventory turnover, order fulfillment time, and delivery efficiency.

### 8.2. Proposed Recommendations (TO-BE)

To address these inefficiencies, a new automated system with real-time tracking, optimized order fulfillment, and advanced analytics is proposed.

#### 8.2.1. Inventory Management System

- **Centralized Inventory Control** – Unified inventory management across all warehouses and plants, ensuring real-time visibility.
- **Automated Stock Replenishment** – Triggers based on minimum stock levels to prevent stockouts and overstocking.
- **Barcode & RFID Tracking** – Minimizes manual entry errors and accurately tracks stock movement.
- **Demand Forecasting Analytics** – Uses historical sales, seasonality, and market trends to improve inventory planning.

#### 8.2.2. Order Fulfillment & Delivery Optimization

- **Automated Order Allocation** – Assigns orders to the closest warehouse or plant for faster shipping.
- **Real-Time Order Tracking** – Provides live updates from dispatch to delivery for internal teams and customers.

- **Automated Customer Notifications** – Sends real-time alerts on order status, estimated delivery time, and tracking details.
- **Optimized Route Planning** – Uses route optimization software to reduce delivery times and improve fuel efficiency.

#### 8.2.3. Data Analytics & Reporting

- **Advanced Reporting & Insights** – Generates automated reports on sales, inventory, and delivery performance for data-driven decisions.
- **Customer Demand Patterns** – Uses predictive analytics to adjust production and inventory based on accurate forecasting.
- **KPI Tracking & Performance Monitoring** – Tracks key performance indicators such as inventory turnover, order processing time, and delivery speed.

### 8.3. Additional Process Enhancements

- **Quality Control Integration** – Ensures product quality checks are performed at multiple stages (production, packaging, and delivery).
- **Cold Storage Management** – Monitors temperature-sensitive storage for ice cream and dairy products.
- **Post-Delivery Feedback & Process Improvement** – Collects and analyzes customer feedback to improve operations.
- **Scalability & Future Integrations** – System designed for future expansion, including integration with AI-based forecasting and automation tools.

## 9. Business Requirements

| ID | Category | Requirement Description |
|---|---|---|
| **BR001** | Inventory Management | Track raw materials and finished products in real-time across multiple locations (manufacturing plants, warehouses, and distribution centers). |
| **BR002** | Inventory Management | Support inventory management across multiple locations and ensure seamless stock transfers between plants and warehouses. |
| **BR003** | Inventory Management | Implement FIFO (First In, First Out) methodology for perishable products (ice cream and milk) to minimize spoilage and ensure freshness. |
| **BR004** | Inventory Management | Send automated expiry and spoilage notifications for perishable stock nearing expiration to reduce wastage. |
| **BR005** | Inventory Management | Trigger automated reorder alerts when stock levels reach a predefined threshold, preventing stockouts. |
| **BR006** | Inventory Management | Organize inventory into categories (raw materials, finished goods, perishable items) for better tracking and quick identification. |

| | | |
|---|---|---|
| **BR007** | Inventory Management | Maintain a stock movement history, tracking when stock is received, issued, or transferred, ensuring clear audit trails. |
| **BR008** | Inventory Management | Provide a centralized inventory dashboard for real-time visibility into stock levels, movements, and reorder status. |
| **BR009** | Inventory Management | Generate detailed inventory reports, including aging stock, consumption rates, and reorder requirements, to support decision-making. |
| **BR010** | Demand Forecasting & Analytics | Use historical sales data, seasonal trends, and market patterns to predict future demand and optimize inventory levels. |
| **BR011** | Demand Forecasting & Analytics | Generate automated reports and analytics on stock status, order history, and delivery performance for data-driven decisions. |
| **BR012** | Demand Forecasting & Analytics | Enable KPI tracking for metrics like inventory turnover, order processing speed, and delivery performance. |
| **BR013** | Order Management | Handle orders from multiple sales channels (online, retail, distributors) and sync inventory levels across them. |
| **BR014** | Order Management | Verify available stock in real-time before confirming order fulfillment, preventing overselling. |
| **BR015** | Order Management | Implement order prioritization, allowing urgent or high-priority orders to be flagged for expedited processing and delivery. |
| **BR016** | Delivery & Logistics Optimization | Enable automated route optimization to suggest the quickest and most cost-effective delivery routes, reducing transportation costs. |
| **BR017** | Delivery & Logistics Optimization | Ensure temperature-controlled delivery conditions for ice cream and milk products to maintain product integrity. |
| **BR018** | Delivery & Logistics Optimization | Offer multiple delivery options (standard, express, same-day) to improve customer satisfaction. |
| **BR019** | Delivery & Logistics Optimization | Assign delivery resources optimally based on order volume, location, and priority, improving efficiency. |
| **BR020** | Delivery & Logistics Optimization | Maintain real-time tracking for delivery vehicles and enable customers to track their orders in real-time. |

| | | |
|---|---|---|
| **BR021** | Delivery & Logistics Optimization | Send automated customer notifications at key delivery stages (order confirmed, dispatched, out for delivery, delivered). |
| **BR022** | System Integration & Scalability | Integrate with the existing ERP system to ensure seamless data sharing between inventory, sales, and other business functions. |
| **BR023** | System Integration & Scalability | Design the system to be scalable, supporting increased inventory volume, additional warehouses, and expanded delivery zones as the business grows. |

**10. Development Plan**

- **Project Duration**: **7 months** (considering integration with ERP and logistics tracking)
- **Team**: Project Manager, Business Analyst, Software Engineers, QA Analysts, UX/UI Designers, Database Administrator, ERP Integration Specialist, Logistics & Route Optimization Expert.

**Phase Timeline**

| Phase | Description | Timeline |
|---|---|---|
| **Requirements Gathering** | Gather and finalize business requirements. | 4 weeks |
| **System Design** | Design system architecture, database, and modules. | 4 weeks |
| **Development** | Front end, back end, API development, and ERP integration. | 10 weeks |
| **Testing** | Functional, performance, security, and integration testing. | 5 weeks |
| **Deployment & Training** | Deploy system, integrate with delivery tracking, and provide user training. | 3 weeks |
| **Go-Live & Support** | System goes live with initial monitoring and support. | 2 weeks |

**11. Resource Plan**

**11.1. Human Resources**

| Role | Responsibilities | Duration |
|---|---|---|

| | | |
|---|---|---|
| **Project Manager** | Oversee the project, timelines, and budgets. | Full Project |
| **Business Analyst** | Gather requirements, document processes, and validate business needs. | Full Project |
| **Front-end Developers** | UI/UX design and implementation. | 10 weeks |
| **Back-end Developers** | Backend logic, API development, and ERP system integration. | 10 weeks |
| **Database Administrator** | Database design, optimization, and stock tracking. | Full Project |
| **ERP Integration Specialist** | Integrate the system with ERP for inventory, sales, and orders. | 8 weeks |
| **Logistics & Route Optimization Expert** | Implement optimized delivery routing and tracking. | 6 weeks |
| **QA Engineers** | Testing for functionality, security, and performance. | 5 weeks |
| **Training Specialist** | Provide training to staff and end-users. | 3 weeks |

### 11.2. Technical Resources

- **Software**:
  - ERP System for inventory, order processing, and sales integration
  - Delivery & logistics tracking software
  - API development and testing tools
  - Database management system (SQL/NoSQL)
  - Cloud-based analytics tools for demand forecasting
- **Hardware**:
  - Servers for real-time data processing and storage
  - Backup and disaster recovery systems
  - RFID/Barcode scanning devices for inventory tracking
  - GPS-enabled devices for real-time delivery monitoring

## 12. Appendices

### 12.1. List of Acronyms

- **ERP** – Enterprise Resource Planning
- **FIFO** – First In, First Out
- **QA** – Quality Assurance

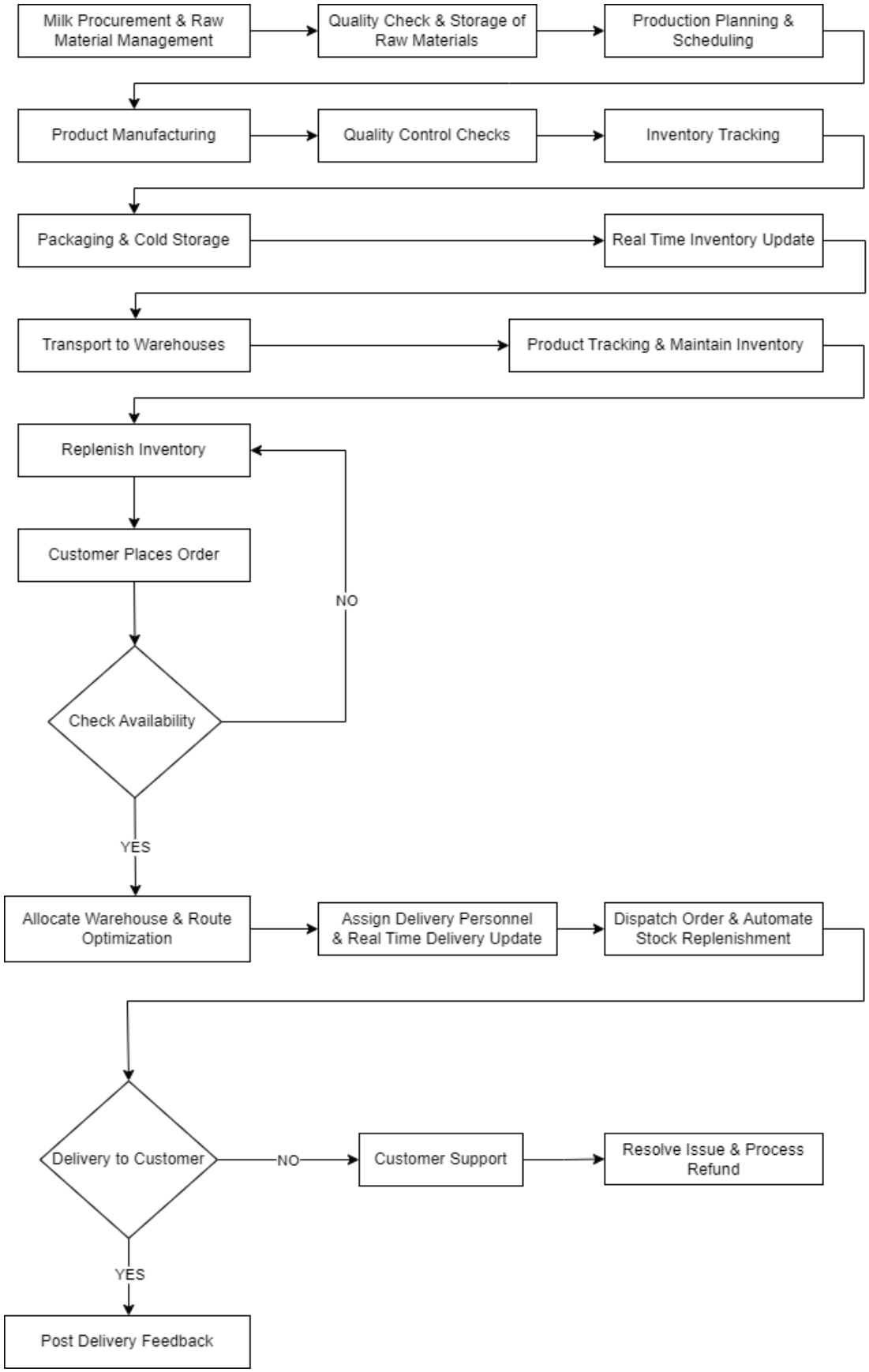
### 12.2. Glossary of Terms

- **Inventory Turnover**: The rate at which inventory is used and replaced over a period of time. A higher turnover rate indicates efficient inventory management.
- **Batch Number**: A unique identifier for a batch of products produced at the same time, often used for traceability in case of quality issues.
- **Raw Materials**: The basic materials (e.g., milk, cream, sugar, flavoring agents) required for production. Proper management of these materials is essential for production efficiency.
- **Perishable Goods**: Products with a limited shelf life, like ice cream and milk, that require special handling, storage, and transportation to prevent spoilage.
- **Cold Storage**: Specialized storage facilities that maintain low temperatures to prevent perishable products from spoiling.

### 12.3. Related Documents:

- **Feasibility Study** – Evaluates the technical, operational, and financial feasibility of implementing the proposed system.
- **Functional Requirements Specification (FRS)** – Provides detailed functional requirements derived from the business requirements, specifying how the system should behave.
- **System Requirements Specification (SRS)** – Defines the technical and software requirements for the system, including hardware, software, security, and performance aspects.
- **Process Flow Diagrams** – Illustrates the AS-IS (current) and TO-BE (proposed) workflows for order processing, inventory management, and delivery logistics.
- **Use Case Specifications** – Defines different user interactions (e.g., placing an order, managing inventory, tracking deliveries) in a structured use case format.
- **Requirement Traceability Matrix (RTM)** – Maps business requirements to functional and system requirements to ensure complete coverage during development.
- **Data Flow Diagram (DFD)** – Represents the flow of data between different modules, such as inventory tracking, order processing, and delivery routing.
- **Risk Assessment & Mitigation Plan** – Identifies potential risks in system implementation and provides mitigation strategies.
- **Change Request Management Plan** – Details how changes to requirements, scope, or system functionality will be handled.
- **Testing Strategy & Test Cases** – Defines the testing plan to ensure the system meets all requirements, including UAT (User Acceptance Testing) and system integration testing.
- **User Manuals & Training Documents** – Guides for end-users and administrators on how to use the system effectively.

**2. Prepare a process flow diagram using your imagination.**



# ASSIGNMENT 2

**1. Write an introduction letter to a client introducing yourself as a business analyst in charge of working with the client and his team to start the business understanding process.**

## Introduction Letter

Dear American Express Team,

I hope this email finds you well.

I am writing to formally introduce myself as the Business Analyst assigned to collaborate with your team on this project. My primary objective is to facilitate a structured approach to understanding your business requirements, ensuring that the proposed solution is aligned with your operational needs and long-term strategic goals.

To achieve this, I will work closely with your team to analyze existing workflows, identify key challenges, and define clear project objectives. Through a detailed requirement-gathering process, we will outline functional and technical specifications that will support the development of a robust and scalable system. The focus will be on optimizing inventory management, streamlining order fulfillment, and improving overall operational efficiency.

Throughout this process, I will ensure that all project activities are conducted with transparency and alignment with your business priorities. I encourage open communication and will be available to address any queries, provide clarifications, and incorporate feedback at every stage of development.

I look forward to working with you and your team to deliver a well-structured and efficient solution. Please feel free to reach out for any further discussions or insights as we proceed.

Best regards,
Swati Kurwade
Business Analyst

**2. Prepare a brief BRD and SRS for a project - Horoscope or Ticketing System or Online Store.**

# Business Requirement Document (BRD)

**Project Name: Ticketing System for Customer Support & Issue Resolution**
**Project ID:** 20250306
**Version ID:** V1.0
**Author:** Swati Kurwade

**Document Revision:**

| Date | Version No. | Document Change |
|---|---|---|
| 06/03/2025 | 0.1 | Initial Draft |
| 13/03/2025 | 1.1 | Update Requirements based on the feedback |
| 27/03/2025 | 1.2 | Encorporated UI/UX changes |

**Approvals:**

| Role | Name | Signature | Date |
|---|---|---|---|
| Project Sponser | Mr. Pargaonkar | | 06/04/2025 |
| Business Owner | Ms.Jahagirdar | | 06/04/2025 |
| Project Manager | Ms. Chaudhary | | 06/04/2025 |
| System Architect | Mr. Bhutekar | | 06/04/2025 |
| Development Lead | Mr. Gange | | 06/04/2025 |
| UX Lead | Ms. Mishra | | 06/04/2025 |
| QA Lead | Ms. Kamat | | 06/04/2025 |

**RACI Matrix:**

| Task/Activity | Project Sponser | Business Owner | Project Manager | System Architect | Devlop Team | QA Team | Support Team | End User |
|---|---|---|---|---|---|---|---|---|
| Project Planning & Initiation | A | R | R | C | I | I | I | I |
| Requirement Gathering & Analysis | C | A | R | C | I | I | C | C |
| System Deisgn & Architectute | I | C | R | A | C | I | I | I |
| Development of Ticketing System | I | C | R | C | A | I | I | I |
| Integration wiht External System | I | C | R | A | R | I | I | I |
| Testing & Quality Asssurance | I | C | R | C | R | A | I | I |
| User Training & Documentation | I | C | R | C | C | C | A | I |
| Deployment & Go-Live Support | I | C | R | C | R | C | A | I |
| Post Deployment Monitoring | I | C | R | C | I | R | A | I |
| On-Going Maintenance & Support | I | C | R | I | I | C | A | I |
| SLA Compliance & Reporting | I | A | R | C | I | I | A | I |

## 1. Introduction:

### 1.1 Business Goal:

The ticketing system aims to:

- **Efficient Ticket Management:** Automate ticket creation, tracking, and resolution to streamline support operations.

- **Enhanced Customer Satisfaction:** Provide real-time updates, self-service options, and structured inquiry handling.
- **Improved Response Time:** Reduce resolution time (FRT & TAT) through automated prioritization and workload optimization.
- **Data-Driven Insights:** Generate reports on ticket trends and response efficiency for continuous improvement.

### 1.2 Business Objectives

- **Automate Ticket Handling:** Enable automatic ticket creation, categorization, and assignment based on priority and agent availability.
- **Service Level Management:** Implement SLAs to ensure timely responses and resolution.
- **Multi-Channel Support:** Allow ticket submission via email, web portal, and chatbots.
- **Real-Time Status Updates:** Provide live tracking and automated notifications for customers and agents.
- **Escalation Management:** Ensure unresolved tickets are escalated based on predefined rules.
- **Analytics & Reporting:** Generate insights on ticket volume, resolution times, and agent performance for continuous improvement.

## 2. Business Rules

- **Ticket Assignment:** Automatically route tickets to the appropriate department based on category, priority, and predefined criteria.
- **Priority Levels:** Classify tickets as Low, Medium, or High, ensuring urgent issues are addressed first.
- **SLA Compliance:** Define resolution timeframes based on priority (e.g., High-priority tickets must be resolved within 4 hours).
- **Automated Status Updates:** Notify customers and agents of ticket progress in real-time.
- **Escalation Management:** Trigger escalations for unresolved tickets to ensure timely resolution.
- **Role-Based Access (RBAC):** Restrict system access based on user roles (Admin, Support Agent, Customer).

## 3. Background

Organizations rely on structured issue resolution to enhance customer experience, reduce manual effort, and ensure accountability. However, the current reliance on email and spreadsheets for tracking support tickets leads to inefficiencies, delayed responses, and poor visibility into ticket status. To address these challenges, the new ticketing system will provide a centralized, automated solution that streamlines ticket management, improves response times, and offers actionable insights for continuous improvement.

### 3.1 Challenges & Pain Points

- **Manual tracking of issues** leads to inefficiencies.
- **Delayed response times** impact customer satisfaction.
- **Lack of visibility** into ticket resolution progress.

- **Difficulty in prioritizing tickets** based on urgency and impact.

### 3.2 Expected Benefits

- **Automated workflows** for ticket assignment and escalation.
- **Improved transparency** with real-time ticket status tracking.
- **Enhanced productivity** through SLA enforcement and reporting.
- **Seamless multi-channel integration** for support requests.

## 4. Project Scope

### 4.1 In-Scope Functionalities

- **Ticket Creation & Submission:** Allow customers to submit tickets via multiple channels (web, email, chatbots).
- **Ticket Tracking & Status Updates:** Provide real-time visibility into ticket progress for customers and agents.
- **Automated Ticket Assignment:** Route tickets to the appropriate department or agent based on category and priority.
- **SLA Management & Escalations:** Define response timeframes with automated alerts and escalations for unresolved tickets.
- **User Management:** Manage user roles and permissions (Admin, Support Agent, Customer).
- **Reporting & Analytics:** Generate insights on ticket resolution time, volume, and agent performance.

### 4.2 Out-of-Scope Functionalities

- **Billing & Invoicing:** Managing payments or customer billing within the ticketing system.
- **AI-Driven Sentiment Analysis:** Automated sentiment detection for customer interactions (planned for future release).
- **External CRM Integration:** Direct integration with third-party customer relationship management (CRM) platforms.
- **Live Chat Support:** Real-time chat functionality for instant support.
- **Knowledge Base:** Implementation of a self-service FAQ or help portal for customers.

## 5. Assumptions

- Users will be trained on the system.
- Internet connectivity will be available for cloud-based access.
- SLAs and priority levels will be defined by the business.

## 6. Constraints

- **Legal Constraints:**
    - The system must comply with GDPR, CCPA, and other applicable data protection laws.
    - User data must be securely stored, processed, and handled to ensure privacy and regulatory compliance.

- **Technical Constraints:**

    - The platform must be compatible with major web browsers (Chrome, Firefox, Edge, Safari).
    - The system should be mobile-responsive and optimized for iOS and Android devices.
    - Integration with email (SMTP), SMS gateways, and CRM platforms must be secure and stable.

- **Performance Constraints:**
    - The system must support up to 10,000 concurrent users without performance degradation.
    - Ticket searches, updates, and report generation should be completed within 5 seconds under normal load.

- **Security Constraints:**
    - User passwords must be encrypted using secure hashing algorithms like bcrypt or SHA-256.
    - Role-Based Access Control (RBAC) must be implemented to restrict access based on user roles.

- **Data Storage Constraints:**
    - Ticket history and logs must be retained for at least two years, unless legal requirements specify otherwise.
    - Daily data backups must be performed to ensure data recovery and prevent loss.

- **Customization Constraints:**
    - The initial version of the system will have limited customization options for workflows and reports.
    - Future updates may introduce additional configuration features based on user requirements.

- **Data Migration Constraints:**
    - Migrating from legacy systems may require additional effort, including data cleansing, transformation, and validation.
    - The migration process must ensure data integrity and minimal downtime during the transition.

## 7. Risks & Mitigation Strategies

### 7.1. Business Risks

- **User Adoption Resistance:** Users may prefer legacy systems, impacting adoption.
    - *Mitigation:* Provide comprehensive training and continuous support to ease the transition.
- **Operational Disruption:** Initial rollout may affect support workflows.
    - *Mitigation:* Implement phased deployment and offer parallel run periods.
- **Regulatory Compliance & Data Security Risks:** Non-compliance with standards (e.g., GDPR) and potential security vulnerabilities.
    - *Mitigation:* Implement role-based access control (RBAC) and encryption; ensure compliance audits.

### 7.2. Requirements Risks

- **Changing Requirements & Scope Creep:** Evolving business needs may lead to unexpected modifications.
    - *Mitigation:* Define clear project scope, conduct regular stakeholder reviews, and control change requests.
- **Incomplete Requirements & Miscommunication:** Misunderstood or missing requirements may cause development issues.
    - *Mitigation:* Maintain thorough documentation, ensure regular stakeholder collaboration, and involve subject matter experts.
- **Testing Limitations:** Insufficient testing may impact requirement validation.
    - *Mitigation:* Expand test coverage, ensure availability of test data, and conduct rigorous QA cycles.

### 7.3. Technical Risks

- **Integration Complexities:** Challenges with third-party software (CRM, ERP) could delay the project.
    - *Mitigation:* Conduct extensive compatibility testing and maintain API flexibility.
- **System Compatibility & Performance Issues:** The system may struggle with high traffic or infrastructure limitations.
    - *Mitigation:* Optimize performance, conduct load testing, and ensure scalable architecture.
- **Data Migration Risks:** Inconsistencies or data loss may occur during migration from legacy systems.
    - *Mitigation:* Perform data validation, cleansing, and backup strategies before migration.

### 7.4. Vendor & External Dependencies

- **Vendor Reliability:** Third-party service failures could impact project timelines.
    - *Mitigation:* Establish service-level agreements (SLAs) and maintain backup solutions.
- **Cost Overruns:** Unexpected vendor-related changes may increase project costs.
    - *Mitigation:* Define a clear vendor contract with cost contingencies.

## 8. <u>Business Process Overview</u>

### 8.1 Legacy System (AS-IS)

- **Ticket Submission:** Customers submit tickets via email or phone calls, leading to inefficiencies.
- **Manual Ticket Assignment:** Support teams manually assign tickets based on availability and content.
- **Tracking & Updates:** Ticket statuses are manually updated in spreadsheets, causing delays and inconsistencies.
- **Lack of Escalation:** No automated process for escalating unresolved tickets.
- **Limited Reporting:** Minimal reporting capabilities, relying on manual data extraction.

### 8.2 Proposed System (TO-BE)

- **Automated Ticketing Portal:** Customers can submit and track tickets through a centralized system.

- **Automated Ticket Routing:** Tickets are assigned based on content, agent workload, and priority.
- **Real-Time Tracking & Notifications:** Customers and agents receive automated status updates.
- **SLA Enforcement:** Ensures timely response and resolution through predefined service levels.
- **Multi-Channel Integration:** Allows ticket submission via email, web portal, and chatbots.
- **Enhanced Reporting & Analytics:** Provides real-time insights and customizable reports for management.

## 9. Business Requirements of the Ticketing System

| Req ID | Requirement Name | Description |
|---|---|---|
| **BR-001** | **User Registration** | Allow users to create accounts and access the ticketing system. |
| **BR-002** | **Multi-Channel Ticket Submission** | Enable users to submit tickets via web portal, email, chatbot, and mobile app. |
| **BR-003** | **Ticket Tracking** | Provide real-time tracking of ticket status for both users and support agents. |
| **BR-004** | **Priority Assignment** | Assign tickets priority levels (High, Medium, Low) based on urgency and impact. |
| **BR-005** | **Ticket Categorization** | Classify tickets based on issue type (e.g., technical support, billing, general inquiry). |
| **BR-006** | **Automated Ticket Assignment** | Assign tickets automatically to the appropriate department or agent based on predefined rules. |
| **BR-007** | **SLA Monitoring & Compliance** | Ensure tickets are resolved within predefined SLAs, with automatic escalation for overdue tickets. |
| **BR-008** | **Notifications & Alerts** | Send automated email/SMS notifications for ticket submissions, updates, and resolutions. |
| **BR-009** | **User Dashboard** | Provide a centralized dashboard for users to view ticket history and statuses. |
| **BR-010** | **Reporting & Analytics** | Generate reports on ticket volume, response time, agent performance, and resolution efficiency. |
| **BR-011** | **Escalation Management** | Automatically escalate unresolved tickets based on SLA breaches or customer requests. |

| | | |
|---|---|---|
| **BR-012** | **Knowledge Base Integration** | Offer a self-service knowledge base for users to find solutions before submitting a ticket. |
| **BR-013** | **Customer Feedback Collection** | Allow users to provide feedback on ticket resolution and support experience. |
| **BR-014** | **Role-Based Access Control (RBAC)** | Implement access restrictions based on user roles (Admin, Support Agent, Customer). |

## 10. Appendices

### 10.1 List of Acronyms

| Acronym | Definition |
|---|---|
| **SLA** | Service Level Agreement – Defines the expected response and resolution times for support tickets. |
| **CRM** | Customer Relationship Management – A system used to manage customer interactions and support. |
| **RBAC** | Role-Based Access Control – A security feature that restricts system access based on user roles. |
| **API** | Application Programming Interface – Allows integration between the ticketing system and other applications. |
| **UI/UX** | User Interface/User Experience – Design aspects that improve system usability. |
| **TAT** | Turnaround Time – The time taken to resolve a support ticket. |
| **FRT** | First Time Response – The time taken for an agent to respond to a newly created ticket. |

### 10.2 Glossary of Terms

| Term | Definition |
|---|---|
| **Ticket** | A record of a customer inquiry, issue, or request that requires support. |
| **Agent** | A support team member responsible for handling and resolving tickets. |
| **Escalation** | The process of forwarding unresolved tickets to a higher-level support team or manager. |

| | |
|---|---|
| **Priority Level** | Classification of tickets (e.g., High, Medium, Low) based on urgency and impact. |
| **Knowledge Base** | A collection of FAQs, guides, and troubleshooting articles for self-service support. |
| **Dashboard** | A visual interface displaying ticket statuses, agent performance, and analytics. |
| **Workflow Automation** | A predefined process that automatically assigns, updates, and escalates tickets based on conditions. |
| **Multi-Channel Support** | The ability to submit and manage tickets via multiple platforms (email, web, chatbots). |
| **Resolution Time** | The total duration required to fully resolve a ticket. |
| **End User** | The customer or employee who submits a ticket for support. |

**10.3 Related Documents:**

- **Project Charter** – Defines the project's purpose, scope, objectives, stakeholders, and high-level requirements.
- **Business Requirements Document (BRD)** – Outlines business needs, objectives, and key requirements for the system.
- **Software Requirements Specification (SRS)** – Provides detailed functional and non-functional requirements, including system behavior and constraints.
- **Functional Requirements Document (FRD)** – Describes specific features, user interactions, and workflows within the system.
- **Technical Design Document (TDD)** – Includes system architecture, database design, API specifications, and integration details.
- **Use Case Document** – Defines system interactions between users and the ticketing system with different scenarios.
- **User Stories & Acceptance Criteria** – Provides a detailed breakdown of user expectations and system behavior for agile development.
- **Risk Assessment & Mitigation Plan** – Identifies potential risks and outlines strategies to manage them.
- **Test Plan & Test Cases** – Details testing procedures, test cases, and expected results to ensure system quality.
- **Deployment Plan** – Covers steps for rolling out the system, including environment setup, migration, and go-live strategy.
- **Training Manual/User Guide** – Provides step-by-step instructions for end-users and support staff on how to use the system.
- **Service Level Agreement (SLA) Document** – Defines ticket resolution timelines, response expectations, and escalation policies.
- **Post-Implementation Review Report** – Assesses system performance, user adoption, and areas for improvement after deployment.

# Software Requirement Specification (SRS)

## 1. Introduction

### 1.1 Purpose

The purpose of this Software Requirements Specification (SRS) is to define the functionality, behavior, and design specifications for developing a Ticketing System. The system aims to streamline customer support operations, enabling efficient ticket submission, tracking, assignment, and resolution while ensuring compliance with Service Level Agreements (SLAs).

### 1.2 Project Goal

To develop a secure, user-friendly, and scalable Ticketing System that enhances customer support efficiency through automated workflows, real-time updates, and multi-channel support.

### 1.3 Business Goal

To improve customer satisfaction, reduce response times, and enhance operational efficiency by automating ticket handling, ensuring SLA compliance, and providing actionable insights through analytics.

### 1.4 Scope

The Ticketing System will allow users to submit tickets via multiple channels (web, email, chatbot), track their status in real time, and receive automated notifications. Support agents will be able to categorize, prioritize, and resolve tickets efficiently. Administrators will have access to role-based controls, SLA management, escalation workflows, and reporting dashboards. The system will be cloud-based, ensuring high availability and seamless integration with third-party tools like CRM and email services.

## 2. System Overview

### 2.1 Key Features

- **User Management**: Customers and agents can register, log in, and manage their accounts.
- **Ticket Creation & Submission**: Users can submit tickets through multiple channels (web portal, email, chatbot).
- **Ticket Categorization & Prioritization**: Tickets can be classified by issue type and urgency (Low, Medium, High).
- **Automated Ticket Assignment**: Tickets are routed to the appropriate agent or department based on predefined rules.
- **SLA Compliance & Escalation**: SLA monitoring ensures timely responses, with automatic escalations for unresolved tickets.
- **Real-Time Notifications**: Users receive automated email/SMS alerts on ticket updates.
- **Knowledge Base Integration**: Self-service articles help users resolve common issues before submitting a ticket.
- **Reporting & Analytics**: Generate reports on ticket volume, resolution time, and agent performance.

### 2.2 User Roles

- **Customer (End-User)**: Submits and tracks tickets, receives notifications, and accesses self-service resources.
- **Support Agent**: Handles assigned tickets, updates statuses, and communicates with customers.
- **Administrator**: Manages system configurations, oversees ticket handling, sets SLAs, and generates reports.

**3. <u>Functional Requirements</u>**

| Req ID | Requirement Name | Description |
|---|---|---|
| **FR-001** | **User Authentication** | Users must be able to register and log in using secure credentials. |
| **FR-002** | **Password Recovery** | The system must support password recovery via email. |
| **FR-003** | **Multi-Channel Ticket Submission** | Users should be able to submit tickets via web form, email, or chatbot. |
| **FR-004** | **Ticket Categorization** | Tickets must be categorized based on issue type (e.g., technical, billing, inquiry). |
| **FR-005** | **Priority Assignment** | Users should be able to prioritize tickets based on urgency (Low, Medium, High). |
| **FR-006** | **Automated Ticket Assignment** | The system should automatically assign tickets to agents based on predefined rules. |
| **FR-007** | **Ticket Status Update** | Agents must be able to update ticket statuses (e.g., Open, In Progress, Resolved). |
| **FR-008** | **Real-Time Notifications** | Users should receive email/SMS notifications regarding ticket updates. |
| **FR-009** | **SLA Compliance Tracking** | The system should track SLA compliance, ensuring timely resolution. |
| **FR-010** | **Escalation Management** | Unresolved tickets should be automatically escalated based on SLA breaches. |
| **FR-011** | **User Dashboard** | Users should have access to a dashboard displaying all open and closed tickets. |
| **FR-012** | **Ticket Search & Filter** | The system should support searching and filtering tickets by various criteria. |
| **FR-013** | **Knowledge Base Access** | Users should be able to search for solutions before submitting tickets. |

| | | |
|---|---|---|
| **FR-014** | **Reporting & Analytics** | Admins should be able to generate reports on ticket resolution times and agent performance. |
| **FR-015** | **Customer Feedback Collection** | The system should collect feedback after ticket resolution. |

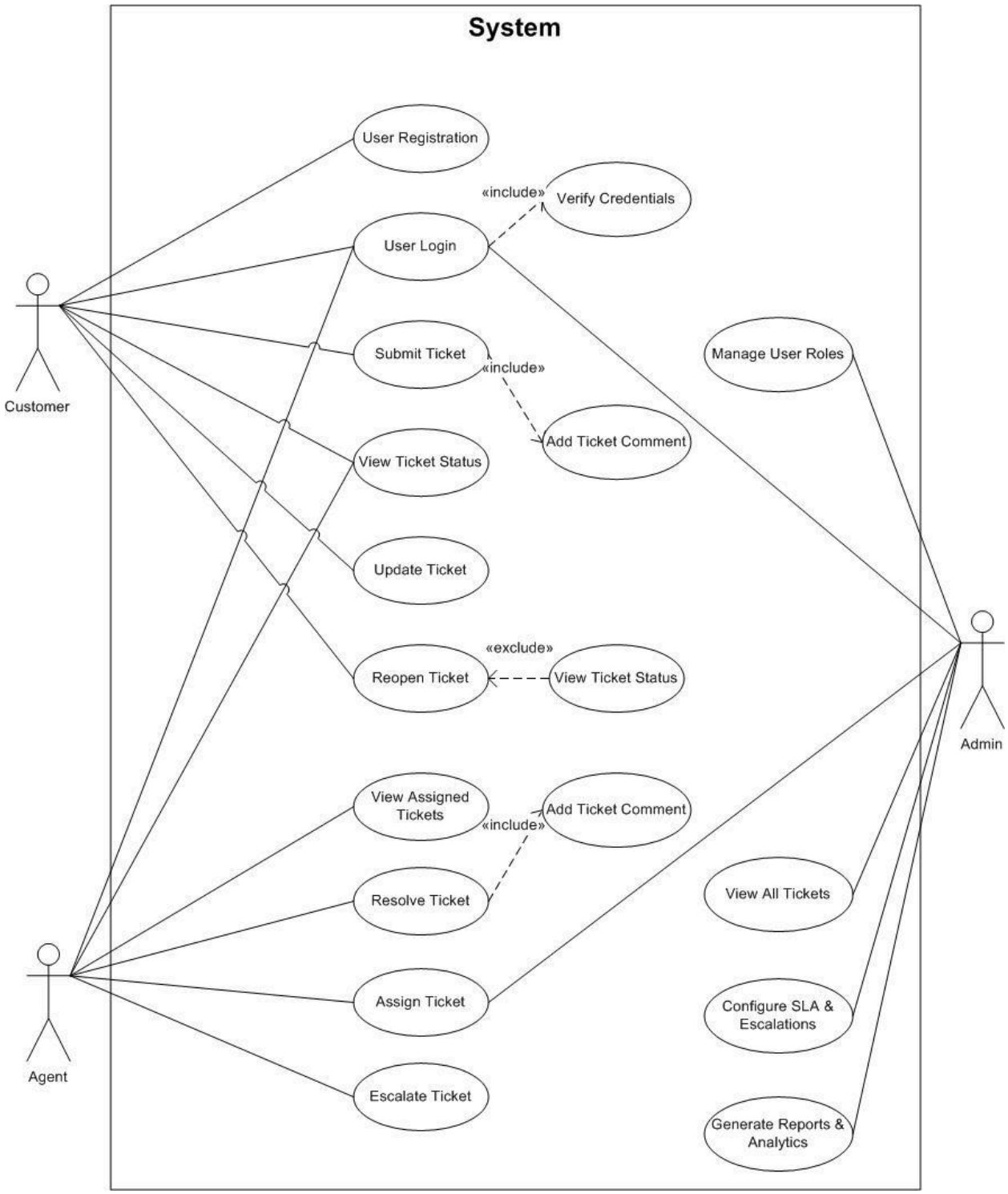
**4. Non-Functional Requirements**

| Req ID | Requirement Name | Description |
|---|---|---|
| **NFR-001** | **Scalability** | The system should support up to 10,000 concurrent users without performance degradation. |
| **NFR-002** | **Performance** | Pages should load within 3 seconds under normal load conditions. |
| **NFR-003** | **Security & Encryption** | User passwords must be encrypted using a secure hashing algorithm. |
| **NFR-004** | **System Growth Readiness** | The system should be scalable to accommodate future user and ticket growth. |
| **NFR-005** | **Mobile Responsiveness** | The system must be optimized for mobile and tablet use. |
| **NFR-006** | **System Availability** | The system should have 99.9% uptime, excluding scheduled maintenance. |
| **NFR-007** | **Compliance & Data Privacy** | The system must comply with GDPR and other data protection regulations. |
| **NFR-008** | **Data Backup & Recovery** | Daily backups should be performed to prevent data loss. |
| **NFR-009** | **Data Integrity** | The system should ensure accuracy and consistency across all modules. |

**5. System Architecture**

- The system will follow a three-tier architecture (Presentation, Logic, Data Layer) for scalability.
- Frontend Technologies: HTML, CSS, JavaScript (React.js).
- Backend Technologies: Node.js with Express for API handling.
- Database: PostgreSQL for storing ticket data, user accounts, and logs.
- Integration: The system will integrate with third-party services like email (SMTP), SMS (Twilio), and CRM (Salesforce, Zoho).
- Deployment: The system will be cloud-hosted on AWS or Azure for high availability.

## 6. Use Case Diagram



**7. Use Case Specification Document:**

| | |
|---|---|
| **Use Case No.** | **UC001** |
| **Use Case Name** | **User Registration and Login** |
| **Description** | Users must register and log in to access the ticketing system. |
| **Actors** | Customer, Authentication System |
| **Preconditions** | - The user must have a valid email or phone number for registration. - The user must have an existing account to log in. |
| **Postconditions** | - The user is successfully logged in and redirected to their dashboard. - The user can create and track support tickets. |
| **Basic Flow** | 1. User navigates to the registration/login page. 2. User enters required details (name, email, password, phone number for registration). 3. System sends a verification email/OTP. 4. User verifies email/phone number. 5. User logs in and accesses their dashboard. |
| **Alternate Flow** | - If email/phone verification fails, the user is prompted to retry. - If incorrect login credentials are entered, an error message is displayed. |
| **Exceptional Flow** | - If multiple failed login attempts occur, the system locks the account and prompts the user to reset their password or contact support. |
| **Assumptions** | - Users have registered with valid credentials. - Users are accessing the system via a compatible browser or app. |
| **Constraints** | - Usernames must include at least one number and one character. - Login attempts may be limited to prevent unauthorized access. |
| **Dependencies** | - Requires stable internet connectivity. - Relies on OTP/email verification services. |
| **Inputs/Outputs** | - **Inputs:** Username, password, email, phone number.<br>- **Outputs:** Successful login message, error messages (invalid credentials, locked account). |
| **Business Rules** | - Users must authenticate themselves with valid credentials. - Passwords must meet security requirements. |
| **Miscellaneous Information** | - Users may have the option to remember their credentials for future logins. - Successful login grants access to ticket submission and tracking. |

| | |
|---|---|
| **Use Case No.** | **UC002** |
| **Use Case Name** | **Ticket Submission** |
| **Description** | Users can submit support tickets for assistance. |
| **Actors** | Customer, Ticketing System |
| **Preconditions** | - The user must be logged in. |
| **Postconditions** | - A ticket is created and assigned to an agent. - The user receives a confirmation and ticket ID. |
| **Basic Flow** | 1. User navigates to the "Submit Ticket" page. 2. User enters ticket details, selects a category and priority, and attaches files (optional). 3. User submits the ticket. 4. The system generates a ticket ID and assigns it to an agent. |
| **Alternate Flow** | - If required fields are missing, the system prompts the user to complete them. |
| **Exceptional Flow** | - If submission fails, the system displays an error message, and the user is asked to retry. |
| **Assumptions** | - Users have access to the internet. |
| **Constraints** | - Users cannot submit multiple tickets for the same issue without a resolution. |
| **Dependencies** | - Requires an active support agent queue. |
| **Inputs/Outputs** | - **Inputs:** Ticket details, category, priority level, attachments.<br>- **Outputs:** Ticket ID, confirmation message, agent assignment notification. |
| **Business Rules** | - Users can only submit tickets for valid support categories. - Urgent tickets are prioritized based on business rules. |
| **Miscellaneous Information** | - Users may be prompted to check the knowledge base before submitting a ticket. |

| | |
|---|---|
| **Use Case No.** | **UC003** |
| **Use Case Name** | **Ticket Assignment and Response** |
| **Description** | Agents can view assigned tickets and respond to users. |

| | |
|---|---|
| **Actors** | Support Agent, Ticketing System |
| **Preconditions** | - The agent must be logged in and have access to assigned tickets. |
| **Postconditions** | - The user receives an update on their ticket status. - The ticket may be resolved or escalated. |
| **Basic Flow** | 1. Agent logs in and navigates to assigned tickets. 2. Agent reviews ticket details. 3. Agent responds to the user or requests additional information. |
| **Alternate Flow** | - If an agent cannot resolve the issue, they escalate the ticket. |
| **Exceptional Flow** | - If system downtime occurs, the agent cannot access tickets. |
| **Assumptions** | - Agents have the necessary permissions to view and respond to tickets. |
| **Constraints** | - Agents must respond within SLA timelines. |
| **Dependencies** | - Requires an active agent queue and notification system. |
| **Inputs/Outputs** | - **Inputs:** Ticket details, agent response, attachments.<br>- **Outputs:** User notification, status update. |
| **Business Rules** | - Agents must resolve tickets within SLA-defined timeframes. |
| **Miscellaneous Information** | - Some tickets may require escalation for specialized support. |

| | |
|---|---|
| **Use Case No.** | **UC004** |
| **Use Case Name** | **Ticket Status Update and Notification** |
| **Description** | Agents update the status of a ticket and notify users. |
| **Actors** | Support Agent, Ticketing System |
| **Preconditions** | - A ticket must exist and be assigned to an agent. |
| **Postconditions** | - The ticket status is updated in the system. - The user is notified of the change. |
| **Basic Flow** | 1. Agent logs into the dashboard and opens an assigned ticket. 2. Agent updates the status to "In Progress," "Resolved," or "Closed." 3. The system sends an automated notification to the user. |

| | |
|---|---|
| **Alternate Flow** | - If the status update fails, the agent receives an error message and retries. |
| **Exceptional Flow** | - If the ticket is incorrectly updated, an audit log allows reversal of the update. |
| **Assumptions** | - The system has automated notification functionality enabled. |
| **Constraints** | - Status updates must comply with SLA timelines. |
| **Dependencies** | - Requires an active ticketing system and working email/SMS service. |
| **Inputs/Outputs** | - **Inputs:** Ticket status changes, agent actions.<br>- **Outputs:** Updated ticket status, user notification message. |
| **Business Rules** | - Users must receive notifications for all ticket status changes. |
| **Miscellaneous Information** | - The system may allow users to manually check ticket status via their dashboard. |

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|---|---|
| **Use Case No.** | **UC005** |
| **Use Case Name** | **Ticket Closure and Feedback Collection** |
| **Description** | Agents close resolved tickets and collect user feedback. |
| **Actors** | Support Agent, Customer, Ticketing System |
| **Preconditions** | - The ticket must be resolved. |
| **Postconditions** | - The ticket is marked as "Closed." - The user receives a feedback form. |
| **Basic Flow** | 1. Agent marks the ticket as "Closed." 2. System sends a feedback form link to the user. 3. User completes and submits the feedback form. |
| **Alternate Flow** | - If the user does not complete the feedback, the system sends a reminder. |
| **Exceptional Flow** | - If feedback submission fails, the system logs the error and prompts the user to retry. |
| **Assumptions** | - Users are willing to provide feedback. |

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| **Constraints** | - Feedback responses must be collected within 7 days of ticket closure. |
| **Dependencies** | - Requires an active email or notification service. |
| **Inputs/Outputs** | - **Inputs:** Ticket closure status, feedback responses.<br>- **Outputs:** Feedback report, confirmation message. |
| **Business Rules** | - Closed tickets must trigger a feedback request. |
| **Miscellaneous Information** | - Feedback data may be used for service improvement. |

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|---|---|
| **Use Case No.** | **UC006** |
| **Use Case Name** | **Ticket Categorization and Priority Assignment** |
| **Description** | Users categorize and prioritize tickets for better resolution. |
| **Actors** | Customer, Ticketing System |
| **Preconditions** | - The user is logged in and submitting a new ticket. |
| **Postconditions** | - The ticket is assigned the correct category and priority. |
| **Basic Flow** | 1. User selects a category (Technical, Billing, General, etc.). 2. User selects a priority level (High, Medium, Low). 3. System assigns the ticket to the appropriate team based on the selection. |
| **Alternate Flow** | - If the user does not select a category or priority, the system prompts them to do so. |
| **Exceptional Flow** | - If an incorrect category is chosen, the system allows an agent to reassign it. |
| **Assumptions** | - Users understand the importance of category selection. |
| **Constraints** | - Some categories may have default priority levels (e.g., "System Outage" = High Priority). |
| **Dependencies** | - Requires predefined ticket categories and priority levels. |
| **Inputs/Outputs** | - **Inputs:** Ticket details, category, priority level.<br>- **Outputs:** Correctly categorized and prioritized ticket. |
| **Business Rules** | - Tickets must be categorized before they are assigned. |

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| **Miscellaneous Information** | - Some tickets may be reassigned based on workload distribution. |

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|---|---|
| **Use Case No.** | **UC007** |
| **Use Case Name** | **Ticket Escalation** |
| **Description** | Agents escalate unresolved tickets to higher support levels. |
| **Actors** | Support Agent, Senior Support Agent |
| **Preconditions** | - The ticket is unresolved and requires specialized attention. |
| **Postconditions** | - The ticket is reassigned to a senior agent. - The user is notified of escalation. |
| **Basic Flow** | 1. Agent identifies the need for escalation. 2. Agent selects the “Escalate” option. 3. System reassigns the ticket to a higher support level. 4. The user receives an update. |
| **Alternate Flow** | - If escalation fails, the system prompts the agent to retry. |
| **Exceptional Flow** | - If no senior agent is available, the system queues the escalation. |
| **Assumptions** | - Some tickets require expertise beyond the initial support level. |
| **Constraints** | - Escalations must follow company-defined support hierarchy. |
| **Dependencies** | - Requires a senior agent queue. |
| **Inputs/Outputs** | - **Inputs:** Ticket details, escalation reason.<br>- **Outputs:** Updated ticket assignment, user notification. |
| **Business Rules** | - Only unresolved or critical tickets should be escalated. |
| **Miscellaneous Information** | - Escalated tickets may take longer to resolve due to complexity. |

| | |
|---|---|
| **Use Case No.** | **UC008** |
| **Use Case Name** | **Commenting on Tickets** |

| | |
|---|---|
| **Description** | Users and agents can add comments to tickets for additional information. |
| **Actors** | Customer, Support Agent, Ticketing System |
| **Preconditions** | - The user or agent is logged in and has access to a specific ticket. |
| **Postconditions** | - The ticket is updated with new comments. - The relevant parties are notified. |
| **Basic Flow** | 1. User or agent navigates to the ticket details page. 2. User or agent enters a comment in the comment field. 3. The system updates the ticket with the new comment. 4. System notifies the relevant parties. |
| **Alternate Flow** | - If comment submission fails, the system notifies the user or agent to retry. |
| **Exceptional Flow** | - If the user does not have permission to comment, the system blocks the action. |
| **Assumptions** | - Users and agents have the necessary permissions to add comments. |
| **Constraints** | - Some tickets may have restricted comment access based on role. |
| **Dependencies** | - Requires an active ticketing system and working notification service. |
| **Inputs/Outputs** | - **Inputs:** Comment text, ticket ID.<br>- **Outputs:** Updated ticket thread, notifications sent to relevant parties. |
| **Business Rules** | - Comments should be visible only to authorized users. |
| **Miscellaneous Information** | - Some tickets may require agent-only comments for internal notes. |

| | |
|---|---|
| **Use Case No.** | **UC009** |
| **Use Case Name** | **Viewing Ticket History** |
| **Description** | Users and agents can view the full history of actions taken on a ticket. |
| **Actors** | Customer, Support Agent, Ticketing System |
| **Preconditions** | - The user or agent is logged in and has access to a specific ticket. |
| **Postconditions** | - The user or agent can see a chronological history of all ticket actions. |

| | |
|---|---|
| **Basic Flow** | 1. User or agent navigates to the ticket details page. 2. System displays the history of actions taken on the ticket, including status changes, comments, and agent responses. |
| **Alternate Flow** | - If the ticket history is inaccessible, the system displays an error message. |
| **Exceptional Flow** | - If there is a system failure, ticket history may be temporarily unavailable. |
| **Assumptions** | - The system maintains logs of ticket actions. |
| **Constraints** | - Ticket history may only be available for a specified retention period. |
| **Dependencies** | - Requires a logging system to track ticket actions. |
| **Inputs/Outputs** | - **Inputs:** Ticket ID, user role.<br>- **Outputs:** Full ticket history, chronological log of actions. |
| **Business Rules** | - Users and agents should only see history relevant to their role. |
| **Miscellaneous Information** | - Agents may have additional history details not visible to customers. |

| | |
|---|---|
| **Use Case No.** | **UC010** |
| **Use Case Name** | **Reporting and Analytics** |
| **Description** | Administrators generate reports on ticket resolution times, agent performance, and other key metr<br>ics. |
| **Actors** | System Administrator, Ticketing System |
| **Preconditions** | - The administrator must be logged in with report access privileges. |
| **Postconditions** | - The system generates a detailed report based on selected metrics. |
| **Basic Flow** | 1. Administrator navigates to the reporting section. 2. Administrator selects desired metrics (e.g., resolution time, ticket volume, agent performance). 3. The system generates a report based on selected metrics. 4. The report is displayed or exported as a file. |
| **Alternate Flow** | - If the report generation fails, the system prompts the administrator to retry or adjust parameters. |

| | |
|---|---|
| **Exceptional Flow** | - If data is unavailable, the system displays an error message and suggests alternative date ranges. |
| **Assumptions** | - Administrators require reporting to monitor performance and compliance. |
| **Constraints** | - Reports may only be available for a specific timeframe based on system storage. |
| **Dependencies** | - Requires ticketing system logs and data storage for historical records. |
| **Inputs/Outputs** | - **Inputs:** Selected report parameters (date range, metrics, agent performance).<br>- **Outputs:** Graphs, charts, exportable reports in CSV/PDF format. |
| **Business Rules** | - Only authorized administrators can access system-wide reports. |
| **Miscellaneous Information** | - Reports may include auto-generated insights or AI-based trend analysis in future updates. |

**3. Make an ERD of creating a support ticket/Ticketing life cycle.**

**Entities:**

**1. Ticket:** Represents the support requests created by users.

| Attribute Name | Data Type | Description |
|---|---|---|
| **Ticket_ID** | INT (PK) | Unique identifier for each ticket. |
| **Title** | VARCHAR | Short title describing the issue. |
| **Description** | TEXT | Detailed description of the problem. |
| **Created_Date** | TIMESTAMP | Date and time when the ticket was created. |
| **Status** | ENUM (‘Open’, ‘In Progress’, ‘Resolved’, ‘Closed’, ‘Escalated’) | The current status of the ticket. |
| **Priority** | ENUM (‘Low’, ‘Medium’, ‘High’, ‘Critical’) | Urgency level of the ticket. |
| **Resolution_Date** | TIMESTAMP (Nullable) | Date and time when the ticket was resolved. |
| **Category_ID** | INT (FK) | The category to which the ticket belongs. |
| **User_ID** | INT (FK) | ID of the customer who created the ticket. |
| **Assigned_Agent_ID** | INT (FK, Nullable) | ID of the support agent handling the ticket. |
| **SLA_ID** | INT (FK) | Service Level Agreement linked to the ticket. |

**2. User (Customers & Agents)**: Represents all users in the system, including customers, support agents, and admins.

| Attribute Name | Data Type | Description |
|---|---|---|
| **User_ID** | INT (PK) | Unique identifier for the user. |

| | | |
|---|---|---|
| **Name** | VARCHAR | Full name of the user. |
| **Email** | VARCHAR (Unique) | Email address of the user. |
| **Contact_Number** | VARCHAR | User's phone number. |
| **Password_Hash** | VARCHAR | Encrypted password for authentication. |
| **User_Type** | ENUM (‘Customer’, ‘Agent’, ‘Admin’) | Defines the type of user. |
| **Created_At** | TIMESTAMP | Date and time of user registration. |
| **Status** | ENUM (‘Active’, ‘Inactive’) | Status of the user account. |

**3. Agent (Specialized Role for Ticket Handling)**: Stores details of support agents separately.

| **Attribute Name** | **Data Type** | **Description** |
|---|---|---|
| **Agent_ID** | INT (PK) | Unique identifier for the agent. |
| **Name** | VARCHAR | Full name of the agent. |
| **Email** | VARCHAR (Unique) | Email address of the agent. |
| **Department** | VARCHAR | Department the agent belongs to. |
| **Role** | ENUM (‘Support Agent’, ‘Specialist’, ‘Manager’) | Defines the agent's role. |
| **Status** | ENUM (‘Active’, ‘Inactive’) | Whether the agent is available for support. |

**4. Category:** Defines different types of tickets.

| **Attribute Name** | **Data Type** | **Description** |
|---|---|---|
| **Category_ID** | INT (PK) | Unique identifier for the category. |
| **Category_Name** | VARCHAR | Name of the category (e.g., Technical, Billing, General). |
| **Description** | TEXT | Explanation of the category purpose. |

**5. Ticket_Comment:** Stores user or agent comments on tickets.

| Attribute Name | Data Type | Description |
|---|---|---|
| **Comment_ID** | INT (PK) | Unique identifier for the comment. |
| **Ticket_ID** | INT (FK) | The ticket associated with the comment. |
| **User_ID** | INT (FK) | ID of the user who added the comment. |
| **Comment_Text** | TEXT | The content of the comment. |
| **Created_Date** | TIMESTAMP | Date and time when the comment was added. |

**6. Attachment:** Stores files related to tickets.

| Attribute Name | Data Type | Description |
|---|---|---|
| **Attachment_ID** | INT (PK) | Unique identifier for the attachment. |
| **Ticket_ID** | INT (FK) | Associated ticket ID. |
| **File_Path** | VARCHAR | File storage location. |
| **Uploaded_Date** | TIMESTAMP | Date and time when the file was uploaded. |

**7. SLA (Service Level Agreement):** Defines response and resolution times for different ticket priorities.

| Attribute Name | Data Type | Description |
|---|---|---|
| **SLA_ID** | INT (PK) | Unique identifier for the SLA policy. |
| **Priority_Level** | ENUM (‘Low’, ‘Medium’, ‘High’, ‘Critical’) | Priority level for which the SLA applies. |
| **Response_Time_Limit** | INT | Maximum response time in hours. |
| **Resolution_Time_Limit** | INT | Maximum resolution time in hours. |

**8. Ticket_Escalation:** Tracks escalated tickets.

| Attribute Name | Data Type | Description |
|---|---|---|

| | | |
|---|---|---|
| **Escalation_ID** | INT (PK) | Unique identifier for the escalation. |
| **Ticket_ID** | INT (FK) | The escalated ticket ID. |
| **Escalated_By** | INT (FK) | ID of the agent who escalated the ticket. |
| **Escalated_To** | INT (FK) | ID of the higher-level agent or manager. |
| **Escalation_Reason** | TEXT | Explanation for escalation. |
| **Escalated_At** | TIMESTAMP | Date and time of escalation. |

**9. Notification:** Stores notifications sent to users.

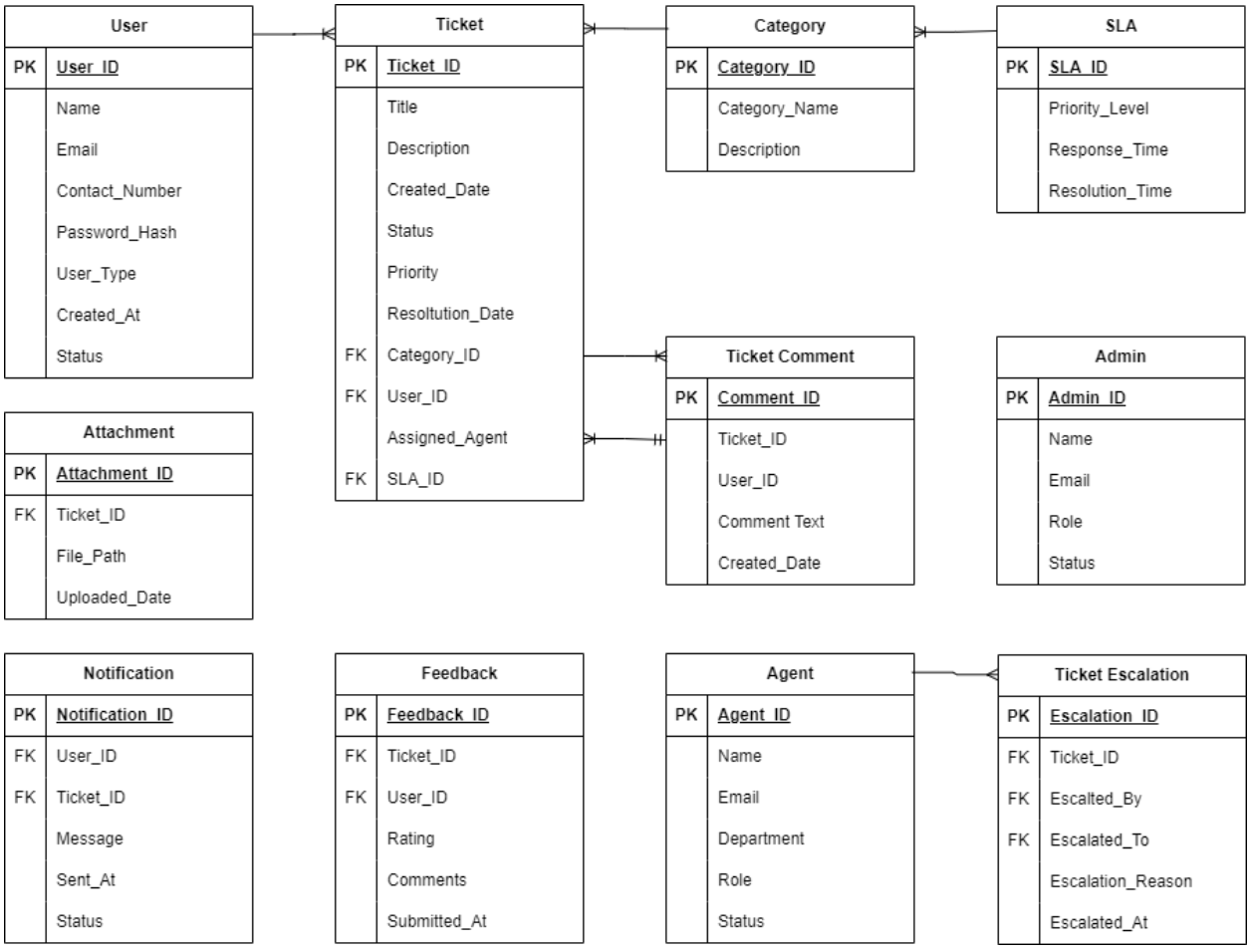
| Attribute Name | Data Type | Description |
|---|---|---|
| **Notification_ID** | INT (PK) | Unique identifier for the notification. |
| **User_ID** | INT (FK) | The recipient of the notification. |
| **Ticket_ID** | INT (FK) | Associated ticket ID. |
| **Message** | TEXT | Content of the notification. |
| **Sent_At** | TIMESTAMP | Date and time of notification. |
| **Status** | ENUM (‘Sent’, ‘Failed’) | Status of the notification. |

**10. Feedback:** Stores user feedback after ticket resolution.

| Attribute Name | Data Type | Description |
|---|---|---|
| **Feedback_ID** | INT (PK) | Unique identifier for the feedback. |
| **Ticket_ID** | INT (FK) | The resolved ticket ID. |
| **User_ID** | INT (FK) | ID of the customer providing feedback. |
| **Rating** | INT | Rating score (1 to 5). |
| **Comments** | TEXT | User comments. |
| **Submitted_At** | TIMESTAMP | Date and time of feedback submission. |

**Relationships:**

1. **User to Ticket** → One user can create multiple tickets (**1:N**).
2. **Agent to Ticket** → One agent can be assigned multiple tickets (**1:N**).
3. **Category to Ticket** → Each ticket belongs to one category (**1:N**).
4. **Ticket to Comment** → A ticket can have multiple comments (**1:N**).
5. **Ticket to Attachment** → A ticket can have multiple attachments (**1:N**).
6. **Ticket to SLA** → Each ticket follows one SLA (**1:N**).
7. **Ticket to Notification** → A ticket can trigger multiple notifications (**1:N**).
8. **Ticket to Feedback** → A ticket can receive one feedback entry (**1:1**).
9. **Ticket to Escalation** → A ticket can be escalated multiple times (**1:N**).



**4. User story of shopping from ecommerce.**

| **US001: User Registration & Login** | |
|---|---|
| **Tasks:** 3 | **Priority:** High |
| As a customer, I want to create an account so that I can have a personalized shopping experience. | |
| **BV:** 500 | **CP:** 5 |
| **Acceptance Criteria:**<br>● Registration and login screens with fields for email, password, phone number.<br>● Option for social media login.<br>● System sends a verification email/OTP. | |

| **US002: Guest Checkout** | |
|---|---|
| **Tasks:** 3 | **Priority:** Medium |
| As a customer, I want to check out as a guest so that I can complete a purchase without creating an account. | |
| **BV:** 200 | **CP:** 3 |
| **Acceptance Criteria:**<br>● Users can complete checkout without registration.<br>● Option to create an account after purchase. | |

| **US003: Update Account Information** | |
|---|---|
| **Tasks:** 2 | **Priority:** Medium |
| As a customer, I want to update my personal details so that my information remains accurate. | |
| **BV:** 100 | **CP:** 3 |
| **Acceptance Criteria:**<br>● Users can edit email, password, and phone number.<br>● Changes are securely saved. | |

| **US004: Manage Addresses** |
|---|

| **Tasks:** 2 | **Priority:** Medium |
|---|---|
| As a customer, I want to save multiple shipping addresses so that I can select one at checkout. | |
| **BV:** 100 | **CP:** 3 |
| **Acceptance Criteria:**<br>● Users can add, edit, and delete addresses.<br>● Option to set a default address. | |

| **US005: Browse Products by Category** | |
|---|---|
| **Tasks:** 3 | **Priority:** High |
| As a customer, I want to browse products by category so that I can easily find items. | |
| **BV:** 500 | **CP:** 5 |
| **Acceptance Criteria:**<br>● Categories visible on homepage/navigation bar.<br>● Clicking a category filters products accordingly. | |

| **US006: Search for Products** | |
|---|---|
| **Tasks:** 3 | **Priority:** High |
| As a customer, I want to search for products using keywords so that I can quickly find what I need. | |
| **BV:** 500 | **CP:** 5 |
| **Acceptance Criteria:**<br>● Search bar available and functional.<br>● Relevant search results displayed. | |

| **US007: Apply Filters & Sorting** | |
|---|---|
| **Tasks:** 4 | **Priority:** High |
| As a customer, I want to filter and sort products based on my preferences. | |
| **BV:** 500 | **CP:** 8 |
| **Acceptance Criteria:**<br>● Filters include price, brand, ratings, availability. | |

| |
|---|
| ● Sorting options by price, popularity, and ratings. |

| **US008: View Product Details** | |
|---|---|
| **Tasks:** 4 | **Priority:** High |
| As a customer, I want to see detailed product descriptions, images, and customer reviews before purchasing. | |
| **BV:** 500 | **CP:** 8 |
| **Acceptance Criteria:**<br>● Product pages contain specifications, reviews, ratings.<br>● High-quality images available. | |

| **US009: Add to Cart** | |
|---|---|
| **Tasks:** 3 | **Priority:** High |
| As a customer, I want to add items to my shopping cart so that I can review them before purchasing. | |
| **BV:** 500 | **CP:** 5 |
| **Acceptance Criteria:**<br>● Cart icon updates dynamically.<br>● Items remain in cart until checkout. | |

| **US010: Wishlist Functionality** | |
|---|---|
| **Tasks:** 2 | **Priority:** Medium |
| As a customer, I want to save products to my wishlist so that I can purchase them later. | |
| **BV:** 200 | **CP:** 3 |
| **Acceptance Criteria:**<br>● Wishlist visible in user account.<br>● Option to move items from wishlist to cart. | |

| **US011: Proceed to Checkout** | |
|---|---|
| **Tasks:** 3 | **Priority:** High |

| As a customer, I want to complete my purchase securely. | |
|---|---|
| **BV:** 500 | **CP:** 5 |
| **Acceptance Criteria:**<br>● Cart details transfer to checkout page.<br>● Users must confirm order details. | |

| **US012: Choose Payment Method** | |
|---|---|
| **Tasks:** 4 | **Priority:** High |
| As a customer, I want to select my preferred payment method. | |
| **BV:** 500 | **CP:** 8 |
| **Acceptance Criteria:**<br>● Options include credit card, PayPal, UPI, COD. | |

| **US013: Track Order Status** | |
|---|---|
| **Tasks:** 4 | **Priority:** High |
| As a customer, I want to track my order in real time. | |
| **BV:** 500 | **CP:** 8 |
| **Acceptance Criteria:**<br>● Live order tracking with estimated time. | |

| **US014: Cancel an Order** | |
|---|---|
| **Tasks:** 4 | **Priority:** High |
| As a customer, I want to cancel my order before shipping. | |
| **BV:** 500 | **CP:** 8 |
| **Acceptance Criteria:**<br>● Cancellation allowed before shipment. | |

| **US015: Manage Product Listings** | |
|---|---|
| **Tasks:** 4 | **Priority:** High |

| As an admin, I want to add, update, and remove products so that the product catalog remains accurate. | |
|---|---|
| **BV:** 500 | **CP:** 8 |
| **Acceptance Criteria:**<br>● Admin can add, edit, or delete product listings.<br>● Changes are reflected on the storefront in real-time. | |

| **US016: Manage Inventory Levels** | |
|---|---|
| **Tasks:** 4 | **Priority:** High |
| As an admin, I want to track and update stock levels so that products are available as per demand. | |
| **BV:** 500 | **CP:** 8 |
| **Acceptance Criteria:**<br>● Inventory updates automatically when a purchase is made.<br>● Low-stock alerts notify the admin. | |

| **US017: Process & Update Orders** | |
|---|---|
| **Tasks:** 4 | **Priority:** High |
| As an admin, I want to view and update order statuses so that customers are informed about their purchase progress. | |
| **BV:** 500 | **CP:** 8 |
| **Acceptance Criteria:**<br>● Admin can modify order statuses (Processing, Shipped, Delivered, Cancelled).<br>● Customers receive order status updates via email/SMS. | |

| **US018: Handle Customer Complaints** | |
|---|---|
| **Tasks:** 3 | **Priority:** Medium |
| As an admin, I want to manage customer complaints so that issues can be resolved quickly. | |
| **BV:** 200 | **CP:** 5 |
| **Acceptance Criteria:** | |

| |
|---|
| ● Admin receives, reviews, and responds to complaints.<br>● Complaints are tracked and categorized based on issue type. |

| **US019: Manage Discounts & Offers** | |
|---|---|
| **Tasks:** 3 | **Priority:** Medium |
| As an admin, I want to create and manage promotional discounts so that I can attract more customer. | |
| **BV:** 200 | **CP:** 5 |
| **Acceptance Criteria:**<br>● Admin can create, modify, and remove discount codes.<br>● Discounts are applied correctly at checkout. | |

| **US020: View Sales Analytics** | |
|---|---|
| **Tasks:** 3 | **Priority:** Medium |
| As an admin, I want to access analytics on sales trends so that I can make data-driven decisions. | |
| **BV:** 200 | **CP:** 5 |
| **Acceptance Criteria:**<br>● Admin dashboard provides reports on revenue, sales trends, and best-selling products.<br>● Data is filterable by time, category, and location. | |

| **US021: Moderate & Approve Product Reviews** | |
|---|---|
| **Tasks:** 3 | **Priority:** Medium |
| As an admin, I want to approve or remove customer reviews so that only valid and appropriate feedback is displayed. | |
| **BV:** 200 | **CP:** 5 |
| **Acceptance Criteria:**<br>● Admin can approve, reject, or delete product reviews.<br>● Users are notified about the status of their reviews. | |

| **US022: Set Up Tax & Shipping Rates** | |
|---|---|
| **Tasks:** 4 | **Priority:** High |
| As an admin, I want to configure tax and shipping rates so that customers are charged correctly. | |
| **BV:** 500 | **CP:** 8 |
| **Acceptance Criteria:**<br>● Admin can set tax rates based on location.<br>● Shipping rates adjust dynamically based on weight and distance. | |

| **US023: Register as a Seller** | |
|---|---|
| **Tasks:** 4 | **Priority:** High |
| As a seller, I want to register my store so that I can list and sell my products. | |
| **BV:** 500 | **CP:** 8 |
| **Acceptance Criteria:**<br>● Sellers can register by providing store details.<br>● Admin approves or rejects the registration request. | |

| **US024: Upload & Manage Product Listings** | |
|---|---|
| **Tasks:** 4 | **Priority:** High |
| As a seller, I want to add, update, and remove products so that my catalog is accurate. | |
| **BV:** 500 | **CP:** 8 |
| **Acceptance Criteria:**<br>● Sellers can add product images, descriptions, and prices.<br>● Listings update in real-time. | |

| **US025: View & Manage Incoming Orders** | |
|---|---|
| **Tasks:** 4 | **Priority:** High |
| As a seller, I want to track and fulfill orders so that I can manage my store efficiently. | |
| **BV:** 500 | **CP:** 8 |

**Acceptance Criteria:**
- Sellers receive notifications for new orders.
- Orders can be marked as "Processing," "Shipped," or "Cancelled."

| **US026: Respond to Customer Inquiries** | |
|---|---|
| **Tasks:** 3 | **Priority:** Medium |
| As a seller, I want to answer customer queries so that I can improve customer satisfaction. | |
| **BV:** 200 | **CP:** 5 |
| **Acceptance Criteria:**<br>● Sellers receive and respond to customer messages.<br>● Customers get notified when their question is answered. | |

| **US027: Adjust Prices & Offer Promotions** | |
|---|---|
| **Tasks:** 3 | **Priority:** Medium |
| As a seller, I want to modify product prices and run promotions so that I can attract more customers. | |
| **BV:** 200 | **CP:** 5 |
| **Acceptance Criteria:**<br>● Sellers can change prices dynamically.<br>● Promotional banners appear for discounted products. | |

| **US028: Track Earnings & Payment History** | |
|---|---|
| **Tasks:** 3 | **Priority:** Medium |
| As a seller, I want to track my earnings and payment status so that I can monitor my revenue. | |
| **BV:** 200 | **CP:** 5 |
| **Acceptance Criteria:**<br>● Earnings dashboard shows completed and pending payments.<br>● Payment history can be exported as a report. | |

| **US029: Register & Set Availability** |
|---|

| **Tasks:** 3 | **Priority:** Medium |
|---|---|
| As a delivery person, I want to register and set my availability so that I receive delivery assignments accordingly. | |
| **BV:** 200 | **CP:** 5 |
| **Acceptance Criteria:**<br>● Registration form requires personal details and verification.<br>● Availability toggle allows switching between active/inactive. | |

| **US030: Receive & Accept Delivery Requests** | |
|---|---|
| **Tasks:** 4 | **Priority:** High |
| As a delivery person, I want to accept delivery requests so that I can complete orders. | |
| **BV:** 500 | **CP:** 8 |
| **Acceptance Criteria:**<br>● New delivery notifications are sent in real-time.<br>● Orders can be accepted or declined. | |

| **US031: View Optimized Delivery Routes** | |
|---|---|
| **Tasks:** 4 | **Priority:** High |
| As a delivery person, I want to see optimized routes so that I can complete deliveries efficiently. | |
| **BV:** 500 | **CP:** 8 |
| **Acceptance Criteria:**<br>● System calculates fastest delivery routes.<br>● Live traffic updates adjust routes. | |

| **US032: Mark Order as Picked Up** | |
|---|---|
| **Tasks:** 3 | **Priority:** Medium |
| As a delivery person, I want to update the order status to "Picked Up." | |
| **BV:** 200 | **CP:** 5 |
| **Acceptance Criteria:**<br>● Option to confirm order pickup. | |

| |
|---|
| ● Customers notified when pickup occurs. |

| **US033: Mark Order as Delivered** | |
|---|---|
| **Tasks:** 3 | **Priority:** Medium |
| As a delivery person, I want to confirm order delivery so that the system updates the status. | |
| **BV:** 200 | **CP:** 5 |
| **Acceptance Criteria:**<br>● Customers receive delivery confirmation.<br>● Proof of delivery (signature or photo) is required. | |

| **US034: Live Chat Customer Support** | |
|---|---|
| **Tasks:** 4 | **Priority:** High |
| As a customer, I want to chat with customer support in real-time so that I can quickly resolve my queries or issues. | |
| **BV:** 500 | **CP:** 8 |
| **Acceptance Criteria:**<br>● Live chat feature is accessible from the homepage and order details page.<br>● Users can initiate a chat session with a support agent.<br>● Chat history is saved and accessible in the user's account.<br>● Automated chatbot assistance is available for common questions.<br>● System provides estimated wait time before connecting to a human agent. | |

| **US035: Product Demo Videos on Listings** | |
|---|---|
| **Tasks:** 3 | **Priority:** Medium |
| As a customer, I want to watch product demonstration videos so that I can better understand how the product works before purchasing. | |
| **BV:** 200 | **CP:** 5 |
| **Acceptance Criteria:**<br>● Product pages support embedded video content.<br>● Videos are high-quality and load without lag.<br>● Users can play, pause, and expand videos.<br>● Videos include captions and descriptions for accessibility.<br>● System supports multiple video formats (MP4, WebM, etc.). | |

| **US036: Multi-Language Support** | |
|---|---|
| **Tasks:** 4 | **Priority:** High |
| As an international shopper, I want to browse the website in my preferred language so that I can navigate easily. | |
| **BV:** 500 | **CP:** 8 |
| **Acceptance Criteria:**<br>● Users can select their preferred language from a dropdown menu.<br>● All text, including product details, navigation menus, and checkout pages, are translated.<br>● Language preferences are saved for future visits.<br>● The system detects the user's location and suggests a relevant language.<br>● Option to switch languages at any time without losing session data. | |

| **US037: Currency Conversion for International Users** | |
|---|---|
| **Tasks:** 4 | **Priority:** High |
| As an international shopper, I want to see prices in my local currency so that I can understand product costs easily. | |
| **BV:** 500 | **CP:** 8 |
| **Acceptance Criteria:**<br>● Prices are displayed in the user's preferred currency.<br>● Automatic currency detection based on geolocation.<br>● Users can manually select a currency from a dropdown menu.<br>● Exchange rates are updated in real-time.<br>● Currency conversion is reflected at checkout. | |

| **US038: Reorder Past Purchases with One Click** | |
|---|---|
| **Tasks:** 3 | **Priority:** Medium |
| As a customer, I want to reorder my past purchases quickly so that I can save time on repeat orders. | |
| **BV:** 200 | **CP:** 5 |
| **Acceptance Criteria:**<br>● Users can view past orders in the order history section. | |

- A "Reorder" button is available next to past purchases.
- Users can modify item quantities before checkout.
- System notifies users if any items from the past order are out of stock.
- Checkout process is streamlined for faster purchase.

| **US039: Receive Notifications for Order Updates** | |
|---|---|
| **Tasks:** 4 | **Priority:** High |
| As a customer, I want to receive notifications about my order status so that I can stay informed. | |
| **BV:** 500 | **CP:** 8 |
| **Acceptance Criteria:**<br>● Users can opt-in for notifications via email, SMS, or push notifications.<br>● Notifications are sent for key events (Order Confirmed, Shipped, Out for Delivery, Delivered).<br>● Delivery personnel receive alerts when an order is ready for pickup.<br>● System sends estimated delivery time updates if there are delays.<br>● Users can customize notification preferences in their account settings. | |

| **US040: Dark Mode & Accessibility Settings** | |
|---|---|
| **Tasks:** 3 | **Priority:** Medium |
| As a user, I want to enable dark mode and accessibility features so that I can customize my browsing experience for comfort. | |
| **BV:** 200 | **CP:** 5 |
| **Acceptance Criteria:**<br>● Users can toggle between light and dark mode.<br>● Font size and contrast settings are adjustable for accessibility.<br>● System saves user preferences for future visits.<br>● Compliance with WCAG (Web Content Accessibility Guidelines) for users with disabilities.<br>● Voice navigation support for visually impaired users. | |